LIT-124/GCD 98-25 N00

**Marked-Up C py**

In the Claims:

Please amend claims 1, 4, and 21-22 by substitution as follows:

1. An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, wherein each of said input couplers within any of said z sensor groups is connected to a corresponding one of said m distribution fiber lines, wherein each of said output couplers within any of said z sensor groups is connected to a corresponding one of said n return fiber lines;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in the returned optical signal power levels; ~~and~~

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler;

wherein m is 6 and n is 16.

4. A sensor array, comprising:

distribution fiber lines;

return fiber lines; and

sensor groups, each of said sensor groups comprising:

sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, wherein each of said input couplers within any of said sensor groups is connected to a corresponding one of said distribution fiber lines, wherein each of said output couplers within any of said sensor groups is connected to a corresponding one of said return fiber lines; ~~and~~

wherein coupling ratios of said input couplers and said output couplers are chosen to reduce differences in the returned optical signal power levels, said input couplers in a first sensor group having a first input coupling ratio and said input couplers in a second sensor group having a second input coupling ratio different from said first input coupling ratio;

wherein one or more signal sources, that comprise a first signal source, are coupled with respective ones of said distribution fiber lines, that comprise a first distribution fiber line;

wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located on the first distribution fiber line between the first signal source and said first input coupler, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first input coupler is based on the first number, wherein a second number of said input couplers are located between the first signal source and said second input coupler, wherein the coupling ratio of said second input coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second input coupler is larger than the coupling ratio of said first input coupler;

wherein each output coupler is connected to a respective return fiber line from a sensor group having a coupling ratio that differs from the coupling ratio of the other output couplers connected to the respective return fiber line, wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler, said input coupling ratios and said output coupling ratios selected in accordance with respective locations of said input couplers on said distribution fiber lines and respective locations of said output couplers on said return fiber lines.

21. An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, wherein each of said input couplers within any of said z sensor groups is connected to a corresponding one of said m distribution fiber lines, wherein each of said output couplers within any of said z sensor groups is connected to a corresponding one of said n return fiber lines; ~~and~~

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in the returned optical signal power levels, wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located between a signal source and said first input coupler on one of said m distribution lines, wherein the first number is greater than or equal to zero, wherein a second number of said input couplers are located between the signal source and said second input coupler on the distribution line, wherein the second number is greater than the first number, wherein the input coupling ratio of said second input coupler is higher than the input coupling ratio of said first input coupler;

wherein m is 6 and n is 16.

22. An m × n sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said z sensor groups being connected to a different one of said m distribution fiber lines;

wherein the n return fiber lines comprise one or more sets of return fiber lines, wherein a first one of each of the one or more sets of return fiber lines is connected to a first subset of said output couplers within a respective one of said z sensor groups, wherein a second one of each of the one or more sets of return fiber lines is connected to a second subset of said output couplers within the respective one of said z sensor groups;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in the returned optical signal power levels; ~~and~~

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler;

wherein m is 6 and n is 16.

**Remarks**

Entry of the above-noted amendments, reconsideration of the application, and allowance of all claims pending are respectfully requested. By this amendment, claims 1, 4, and 21-22 are amended. These amendments to the claims constitute a bona fide attempt by applicants to advance prosecution of the application and obtain allowance of certain claims, and are in no way meant to acquiesce to the substance of the rejections. Support for the amendments can be found throughout the specification (e.g., page 2, line 28, to page 3, line 2; page 4, line 27, to page 5, line 10; page 5, lines 15-18; page 5, line 27, to page 6, line 15; page 6, lines 24-29; page 8, lines 3-11; and page 8, lines 20-21), drawings (e.g., FIGS. 1, 2A-2H, 3, 4A-4H, and 5), and claims and thus, no new matter has been added. Claims 1 and 3-30 are pending.

Claim Rejections - 35 U.S.C. §112:

Claims 1, 4, and 21 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

The Office Action states at paragraph 2, page 2:

> Claims 1, 4 and 21 have been amended and the amendments make the claims fail to provide structural relationships among the distribution fiber lines, the return fiber lines and the sensor groups. This lacking of the structural relationships makes the claims *incomplete* and fails to give definite scopes of the claims. Structural relationship phrase such as "each input couplers within one of the said z sensor groups being connected to one of the distribution fiber lines and the output couplers within the one sensor group are connected to one or a pair of the return fiber lines" should be added to positively link the cited elements in order to make the claims complete and operable. (*Emphasis in original.*)

Applicants have amended claims 1 and 21 to recite "wherein each of said input couplers within any of said z sensor groups is connected to a corresponding one of said m distribution

fiber lines, wherein each of said output couplers within any of said z sensor groups is connected to a corresponding one of said n return fiber lines." Applicants have amended claim 4 to recite "wherein each of said input couplers within any of said sensor groups is connected to a corresponding one of said distribution fiber lines, wherein each of said output couplers within any of said sensor groups is connected to a corresponding one of said return fiber lines." The amendment provides a structural relationship between the distribution fiber lines, the return fiber lines, and the sensor groups. Applicants respectfully submit claims 1, 4, and 21 presented herewith are definite.

In addition, the Office Action states at paragraph 2, page 2:

> The phrases in the claims (claims 1, 4, 21 and 22) concern[ing] the coupling ratio of the output couplers and/or the input couplers are confusing and indefinite since it is not clear if these output couplers and/or the input couplers are couplers within a sensor group or not. The specification does not clearly show the coupling ratio of output couplers (or input couplers) is related to each other when the couplers are **not** within the same sensor group. Clarifications are required. (*Emphasis in original.*)

MPEP § 2173.04 states:

> Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

With respect to the coupling ratio of the first output coupler, claim 1 recites:

> wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines,...wherein the coupling ratio of said first output coupler is based on the first number,...

With respect to the coupling ratio of the second output coupler, claim 1 recites:

> wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number,...

With respect to the relation between the coupling ratio of the second output coupler and the coupling ratio of the first output coupler, claim 1 recites:

> wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler,...

The coupling ratio of the second output coupler is related to the coupling ratio of the first output coupler by a relation between the number of output couplers located between the respective second and first output couplers and the signal destination on the one of the n return fiber lines. For example, referring to FIG. 2A of the subject application, the coupling ratio of the output coupler for the sensor S5 is represented as 47%. Four output couplers are represented as located between the output coupler for the sensor S5 and the signal destination on the return fiber line RF1. In addition, the coupling ratio of the output coupler for the sensor S2 is represented as 20%. One output coupler is represented as located between the output coupler for the sensor S2 and the signal destination on the return fiber line RF1.

So, the number of (four) output couplers located between the output coupler for the sensor S5 and the signal destination on the return fiber line RF1 is greater than the number of (one) output couplers located between the output coupler for the sensor S2 and the signal destination on the return fiber line RF1. Furthermore, the coupling ratio (47%) of the output coupler for the sensor S5 is larger than the coupling ratio (20%) of the output coupler for the sensor S2. Applicants respectfully submit that the specification (e.g., page 5, line 11, to page 6, line 9; page 6, line 16, to page 7, line 12) and figures (e.g., FIGS. 2A-2H and 4A-4H) disclose

the coupling ratios of the output couplers are related to the number of output couplers located between the particular output coupler and the signal destination on the return fiber line. The discussion presented above with respect to claim 1 also applies analogously to independent claims 4 and 21-22.

Withdrawal of the §112, second paragraph, rejection of claims 1, 4, and 21-22 is therefore respectfully requested.

Claims Rejections - 35 U.S.C. §103:

Claims 1, 3-10, and 13-30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Giallorenzi (U.S. Patent No. 4,648,083). This rejection is respectfully, but most strenuously, traversed.

MPEP §706.02(j) states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

MPEP §2143.01 states:

> Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

A "strict observance" of the factual predicates to an obviousness conclusion is required. Graham v. John Deere Co., 383 U.S. 1, 18, 148 U.S.P.Q. (BNA) 459, 467 (1966). Without a motivation to combine references, a rejection based on a prima facie case of obviousness is improper. In re Rouffet, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999). The reference teachings must appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. In re Linter, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Actual evidence of the teaching, suggestion, or motivation is required and must be clear and particular. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999).

Applicants respectfully submit that Giallorenzi does not teach or suggest one or more limitations of the invention recited in claim 1. A careful reading of Giallorenzi fails to teach or suggest, for example, the coupling ratios of the input couplers and the output couplers in the z sensor groups chosen to reduce differences in the returned optical signal power levels, wherein the output couplers comprise the first output coupler and the second output coupler, wherein the first number of the output couplers are located between the first output coupler and the signal destination on one of the n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of the first output coupler is based on the first number, wherein the second number of the output couplers are located between the second output coupler and the signal destination on the one of the n return fiber lines, wherein the coupling ratio of the second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of the second output coupler is larger than the coupling ratio of the first output coupler. This point has even been conceded by the Office Action (paragraph 4, page 4):

> [T]his reference does not teach explicitly that the coupling ratios for the input couplers and output couplers are defined with respect to the other input or output couplers...

Notwithstanding this admitted deficiency of Giallorenzi, the Office Action (paragraph 4, page 4) states:

> [H]owever such features are either inherently included or an obvious modification to one skilled in the art for the benefit of providing sensor array with desired fiber lines transmission performance.

This justification for modifying Giallorenzi conspicuously fails to identify any express teaching, suggestion, or incentive in the art for making the modification. Applicants respectfully

submit, upon review, that Giallorenzi fails to provide the express teaching, suggestion, or incentive.

MPEP §2143.01 states:

> The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990; *emphasis in original*).

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done.

> To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Since no express teaching or suggestion in the art has been identified for the modification of Giallorenzi, attention must be turned to the reasoning to determine whether the Office Action is convincing regarding whether applicants' claimed invention is obvious. In this regard, the justification given by the Office Action (paragraph, page 4) is nothing more than hindsight restatement of the results of the modification.

> [H]owever such features are either inherently included or an obvious modification to one skilled in the art for the benefit of providing sensor array with desired fiber lines transmission performance.

This justification is tantamount to stating that "it would be obvious to modify A to have B because it provides A plus B." This line of reasoning cannot be considered "convincing," since it is settled that it is impermissible to simply engage in hindsight reconstruction of the claimed

invention, using the claimed invention as a template and selecting elements to fill the gaps. Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143 (Fed. Cir. 1995).

A statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999). The teachings of the references must be applied in the context of their significance to a technician at the time without knowledge of the solution. Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143 (Fed. Cir. 1995).

> A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field.

In re Kotzab, 217 F.3d 1365, 1369 (Fed. Cir. 2000).

To reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicants' disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicants' disclosure is often difficult to avoid due to the very

nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Since the justification to modify Giallorenzi is hindsight reconstruction of the results of the present invention, the Office Action's reasoning is actually using the present invention itself as a basis to modify Giallorenzi. This violates the settled principle that a motivation to modify a reference cannot come from the invention itself. Heidelberger Druckmaschinen A.G. v. Hantscho Commercial Products, Inc., 21 F.3d 1068, 1072 (Fed. Cir. 1994).

Also, the Office Action (paragraph 4, page 3) includes the following statement:

> This reference has met all the limitations of the claims with the *exception* that it does not teach explicitly that the number of input fiber lines is 6 and the number of output fiber lines is 16, however such numbers may either be implicitly *implied* by the plurality of N number lines disclosed in the reference of an obvious modification to one skilled in the art for the benefit of providing a sensor array with the desired number of transmission fiber lines. (*Emphasis in original.*)

Assuming, *arguendo*, that this statement is correct, the statement nevertheless fails to teach or suggest the coupling ratios of the input couplers and the output couplers in the z sensor groups chosen to reduce differences in the returned optical signal power levels, wherein the output couplers comprise the first output coupler and the second output coupler, wherein the first number of the output couplers are located between the first output coupler and the signal destination on one of the n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of the first output coupler is based on the first number, wherein the second number of the output couplers are located between the second output coupler and the signal destination on the one of the n return fiber lines, wherein the coupling ratio of the second output coupler is based on the second number, wherein the second number is greater than the

first number, wherein the coupling ratio of the second output coupler is larger than the coupling ratio of the first output coupler.

Arguments presented above with respect to claim 1 also apply analogously to independent claims 4 and 21-22.

For all the above reasons, the independent claims presented herewith are believed neither anticipated nor obvious over the art of the record. The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

In view of the above amendments and remarks, allowance of all claims pending is respectfully requested. If an additional telephone conference would be of assistance in advancing the prosecution of this application, the Examiner is invited to call applicants' attorney.

Respectfully submitted,

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